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Region II 1978-79 ERAMS Summary Data Report

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16. ABSTRACT

This report contains data obtained from the Region II ERAMS stations during 1978 and 1979. Methods and procedures of collection and analysis are described. Data are summarized in table form and analyzed to determine any changes in the radiological quality of the environment.

Analysis of the data shows that levels of radionuclides were well within Federal limits for air, water, and milk. Levels were relatively consistent during the two-year period.

There were no measurable increases in the levels of radionuclides attributable to the TMI incident.

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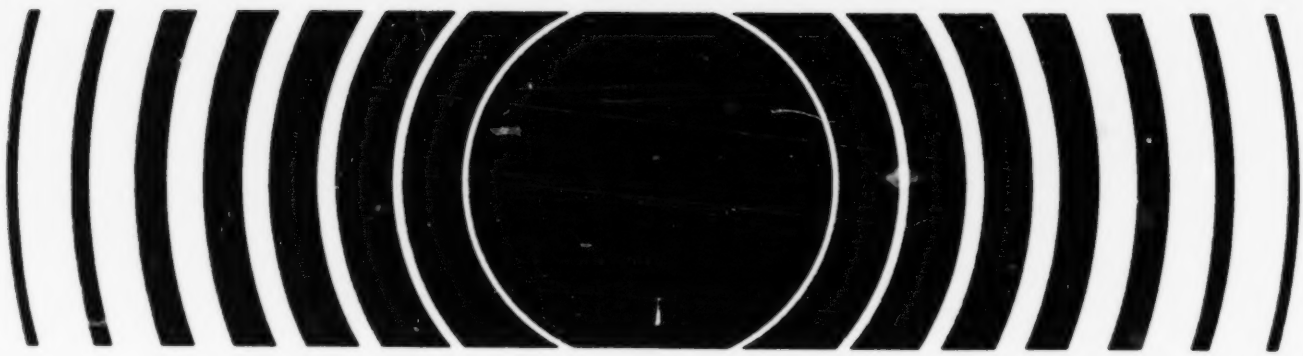

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Region II
1978-79 ERAMS Summary
Data Report

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October 1980

U.S. Environmental Protection Agency
Region II
Regional Office of Radiation Programs
26 Federal Plaza
New York, N.Y. 10278

Foreword

Since their discovery, radioactive materials have played an increasing role in the lives of the world's population. Because of this, environmental radiation monitoring is necessary to guide the development and enforcement of EPA environmental radiation protection standards.

In 1973 the EPA established a network of selected locations to assist in monitoring ambient radioactivity. The Environmental Radiation Ambient Monitoring System - ERAMS - was designed to provide information on the environmental effects of components of the nuclear fuel cycle, such as nuclear power plants and nuclear fuel fabrication and reprocessing plants. In addition, ERAMS helps to provide information on other sources of radioactivity such as isotopes used in medicine and industrial applications.

The system is also designed to provide data on levels of pollutants for standards-setting, verification that standards are being met, evaluation of the effectiveness of controls, and determination of environmental trends. This information helps to provide direct assessment of the population intake of radioactive pollutants. A set of computational dose calculation models are then used to determine total population dose.

Environmental pathways are monitored for significant population exposure from routine and accidental releases of radioactivity from major sources. The ERAMS network can then provide data which may be used in the event of an accidental release of radioactivity to the environment, as an indicator of the need for additional sampling or other actions required to insure public safety. This was again proven by use following the accident at Three Mile Island Nuclear Power Plant, when frequent monitoring provided constant evaluation of air, milk, and water samples to study the effect of any off-site releases.

The data presented here on Region II sites are extracted from ERAMS quarterly reports covering the period from January 1977 to December 1979. Drinking water and surface water samples are compared to the EPA drinking water standards, which went into effect June 24, 1977. Trends, when they occur, are noted.

I believe this report will be valuable to readers concerned with environmental radiation levels in Region II. I encourage users of this report to inform the Radiation Branch of omissions or errors. Your additional comments or request for further information are also solicited.

Charles S. Warren
Regional Administrator

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DENT PROGRAM

The Food and Drug Administration, in cooperation with state and local agencies, operates exposure reduction and quality assurance programs for medical x-ray equipment. The Dental Exposure Normalization Technique (DENT) is utilized to develop effective dental x-ray techniques to reduce exposures to patients as well as dental workers. DENT is an exposure and image quality assessment program designed to identify facilities where the exposures appear unnecessarily high or unusually low for the type of image receptor. Clinical personnel at the facilities are then advised of corrections that can be made in procedures to reduce unproductive patient exposure and to improve image quality.

In New Jersey, over 3000 dentists have participated in the program since it was initiated in September, 1977. As part of the examination, recommendations are made to improve image quality to achieve dose reduction. In 1979, over 590 dentists were visited. As a result of NJ BRP's actions, radiation exposure has been reduced by an average of 262 milliroentgens per film. This exposure reduction benefited 2,734 radiation workers*, 5,053 non-radiation workers**, and the 145,598 patients who were diagnostically x-rayed.

New York State has completed its DENT program.

* A radiation worker is an individual who is either licensed or certified to operate an x-ray machine.

** A non-radiation worker is an individual who works or resides in the area or adjoining area of the x-ray machine but is not involved in the machine operation.

ERAMS Summary

Local Data

The ORP established the Environmental Radiation Ambient Monitoring System (ERAMS) in 1973 to record collected samples of air, water and milk supplies around the country.

General trends of gross alpha and beta radiation and monitoring of radionuclides from the uranium fuel cycle are examined.

This report will consider environmental radiation data collected* and processed by the Eastern Environmental Radiation Facility (EERF) in Montgomery, Alabama, from various sites in Region II.

Each test performed will be discussed and minimum detectable levels noted below. Data for specific locations are shown for 1977 through 1979 for comparison and identification of trend development.

1. Airborne particulates are continuously collected on filters and are checked with a survey meter at time sequences planned to allow decay of radon and thoron daughters. Filters are then sent to EERF for analysis in a low background beta counter. Gamma analysis is performed only on samples with a gross beta count greater then 1 pCi/m^3.
Precipitation samples are also collected and composited monthly. These are analyzed for tritium, gross beta activity and gamma levels. Minimum detectable levels (MDL) for gross beta are 0.01 pCi/m^3 in air, 1 pCi/l in water and 0.01 nCi/m^2 in precipitation [the value in terms of nCi/m^2 would be dependent on precipitation (mm)]. The MDL for tritium is 0.2 nCi/l.

2. Plutonium and uranium in airborne particulate samples are collected on filters which have been exposed to 25,000 to 40,000 m^3 of air for each quarterly composite. After chemical treatment, they are analyzed by alpha spectroscopy. Minimum detectable level is 0.015 pCi/sample.

3. Surface water is monitored downstream from all nuclear facilities in operation or planned through 1979 and at background sites. Tritium is checked quarterly and gamma scans are performed annually. MDL is 0.2 nCi/l.

4. Drinking water is monitored for major population centers or near nuclear facilities. Tritium is measured quarterly. Gamma scan and gross alpha and gross beta analyses are performed on annual composites. An annual test is also run on selected samples for Pu-238, Pu-239, U-234, U-235 and U-238. MDL is 0.015 pCi/sample. Specific iodine-131 analysis is performed on one quarterly sample per year for each station. MDL is 0.4 pCi/l.

* Actual data collection is effectuated by various state and local government agencies listed on the following page. EPA is grateful to these agencies for their assistance.

5. Radon-222 in drinking water is determined by liquid scintillation counting using a 50-minute count and a 10-ml sample. The limit of detection is 0.16 pCi or 16 pCi/l.

6. External gamma ambient monitoring program (EGAMP) provides a continuous measurement of ambient gamma exposure rates, including cosmic rays to evaluate fluctuations in natural background and to provide a means of monitoring significant man-made increases in ambient gamma levels. Thermoluminescent dosimeters are used for this program. MDL is 1 μR/hr.

7. Pasteurized milk is analyzed monthly for content of the following radioisotopes: I-131, Ba-140 and Cs-137; analysis is also performed for potassium. In addition there is an annual analysis for Sr-89 and -90. A composite sample of all states in each region is analyzed quarterly and each individual sample is monitored in July only.

These data provide a basis for comparison of relatively stable natural background radiation levels with the fluctuating levels caused by such sources as nuclear power plants and nuclear tests. Until the Chinese tests in 1976, reduced fallout had tended to allow a reduction in background, while new nuclear power plants had been responsible for most of the increases which appeared. It is these trends which are of primary interest in the ERAMS study.

The following agencies are responsible for collection of samples:

Albany, New York	NYSDEC Division of Air Resources and Radiological Sciences Laboratory, NYS Dept. of Health
Buffalo, New York	NYS Dept. of Agriculture and Markets
New York, New York	NYC Dept. of Environmental Protection and Dept. of Health
Niagara Falls, New York	Niagara County Health Dept.
Ossining, New York	Westchester County Health Dept.
Oswego, New York	by municipal collection
Panama Canal	Sanitation Division, Panama Canal Commission
Poughkeepsie, New York	Bureau of Water Resource Development of the NYC Dept. of Environmental Protection
San Juan, Puerto Rico	Puerto Rico Nuclear Center, Health Physics Division
St. Thomas, Virgin Islands	Office of Natural Resources Management, Dept. of Conservation and Cultural Affairs
Syracuse, New York	Onondaga County Health Dept, Division of Environmental Sanitation
Trenton, New Jersey	New Jersey Dept. of Environmental Protection Bureau of Radiation Protection
Yaphank, New York	Suffolk County Health Dept.

DATA - Reporting Rationale and Procedures

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach facilitates estimates of bias in the nuclide analyses and allows better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses have been reported as the counting results indicate, whether the number is negative, zero, or positive. Numerical values given are as of sample collection date.

Gross Analyses - The actual value of gross radioactivity measurements is reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level is reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses is accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values are rounded to no more than three significant figures. If the last digit to be rounded is five or greater than five, the preceding digit is increased by one, otherwise the preceding digit is not changed.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table on following page. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages are calculated along with appropriate error terms. In calculating these averages, all values of individual data including negative numbers are utilized.

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Plutonium-238 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).

(b) This value in terms of pCi/m^3 would be dependent on the air volume.

(c) Activity as of the day of counting.

Prefix Definitions

Symbol	Meaning	Exponential Expression
m	milli -	10^{-3}
u	micro -	10^{-6}
n	nano -	10^{-9}
p	pico -	10^{-12}
f	fento -	10^{-15}
a	atto	10^{-18}

ANALYSIS OF DATA

Airborne particulates: Gross beta analyses were run on filters both in the field and at the EERF laboratory. The tests at the laboratory revealed significantly higher readings for samples taken after the September and November, 1976, Chinese nuclear tests. The readings dropped again in December to values approaching the former levels. Readings for 1977 through 1979 remained at these levels. Trenton samples showed slightly elevated readings following the Three Mile Island (TMI) incident.

Precipitation samples: No trends were seen in New York City and Trenton. A slight decrease in 1979 was evident in the Niagara Falls samples.

Plutonium and uranium in air: New York City, Niagara Falls, and Trenton are the sampling points in the region. Radionuclide concentration trends were observed within the stations, but not for the region as a whole.

Surface water: Tritium levels found in water around the region showed consistently low levels, never exceeding 3.0% of those allowed by the National Primary Drinking Water Regulations (20,000 pCi/l) and far below the 10 CFR 50 levels of 3,000 pCi/l.

Drinking water: Samples were reasonably consistent in Region II, remaining at less than or equal to 3.0% of the National Primary Water Standards for tritium levels, and at levels well below the allowed values for plutonium and uranium isotopes. Levels for strontium and radium isotopes were also well below levels allowed under the Drinking Water Standards.

Pasteurized milk samples: Samples remained consistent through the two-year period, within statistical error. However, with errors so large (around $\pm$ 100%), it was difficult to detect any trends. By disregarding the error limits, an increase can be noted following the Chinese nuclear tests. Levels decreased during 1977 through 1979 to the former values.

The composite sample data for strontium isotopes has been reasonably consistent throughout Region II over a five-year period. Levels decreased from higher levels detected immediately following the Chinese nuclear tests. There was no measurable increase in these isotopes as a result of the TMI incident.

Analysis of Water Samples Under Drinking Water Standards

ERAMS Data

- The EPA drinking water standards, effective June 24, 1977, set the following maximum levels of radioactivity in drinking water:

Tritium	20,000 pCi/l
Sr-90	8 pCi/l
Sr-89	80 pCi/l
Cs-134	20,000 pCi/l
Cs-137	200 pCi/l
Ba-140	90 pCi/l
Ra-226 and 228	5 pCi/l

- Analysis of the data collected by the ERAMS network during 1977 through 1979 yielded the following information:

  -- Albany drinking water levels were 2% or less of the tritium limits, and less than 10% of the Sr-90 limit.

  -- Bayside (NJ) surface water tritium levels were less than 2% of the drinking water limit.

  -- New York City drinking water levels were 2% or less of the tritium limit, and 3% of the Sr-90 limit. Average values for the city were 1.5% of the tritium limit, and less than 2% of the Sr-90 limit.

  -- Niagara Falls drinking water levels were 2.5% or less of the tritium limit, and less than 14% of the Sr-90 limit. Average values of the location never exceeded 2% of the tritium limit, or 13% of the Sr-90 limit.

  -- Ossining surface water samples never exceeded 2% of the tritium drinking water limit.

  -- Oswego surface water samples never exceeded 2% of the tritium drinking water limit.

  -- Oyster Creek surface water samples were never in excess 2% of the tritium drinking water standard.

  -- San Juan drinking water never exceeded 1.5% of the tritium limit, or 1.3% of the Sr-90 limit.

  -- Syracuse drinking water never exceeded 2.5% of the tritium limit, or 9% of the Sr-90 limit. Average values for the location were less than 2% of the tritium limit, and 8% of the Sr-90 limit.

-- Trenton drinking water levels were 2% of the tritium limit, and 2.5% of the Sr-90 limit. Average values for the city never exceeded 1.5% of the tritium limit, and 1% of the Sr-90 limit.

-- Waretown (NJ) drinking water levels were 3% of the tritium limit, and less than 12% of the Sr-90 limit.

- Average levels in New York State were less than 2% of the tritium limit, and 7% of the Sr-90 limit.

- Average levels in New Jersey were less than 1.5% of the tritium limit, and 1% of the Sr-90 limit.

Maximum Levels of Radioactivity in Surface Water and Drinking Water

A. Maximum values for each location

City	Surface Water	% of 10 CFR 50	Drinking Water		% of DWS*
Albany (NY)			H-3	0.4 nCi/l	2.0
			Sr-90	0.6 pCi/l	7.5
			Ra-226	NA	- -
Bayside (NJ)	0.3 nCi/l	<<1			1.5
New York City			H-3	0.4 nCi/l	2.0
			Sr-90	0.2 pCi/l	2.5
			Ra-226	NA	- -
Niagara Falls (NY)			H-3	0.5 nCi/l	2.5
			Sr-90	1.1 pCi/l	13.8
			Ra-226	NA	- -
Ossining (NY)	0.4 nCi/l	<<1			2.0
Oswego (NY)	0.6 nCi/l	<<1			3.0
Oyster Creek (NJ)	0.3 nCi/l	<<1			1.5
Poughkeepsie (NY)	0.5 nCi/l	<<1			2.5
San Juan (PR)			H-3	0.3 nCi/l	1.5
			Sr-90	0.1 pCi/l	1.3
			Ra-226	NA	- -
Syracuse (NY)			H-3	0.5 nCi/l	2.5
			Sr-90	0.7 pCi/l	8.8
			Ra-226	NA	- -
Trenton (NJ)			H-3	0.4 nCi/l	2.0
			Sr-90	0.2 pCi/l	2.5
			Ra-226	NA	- -
Waretown (NJ)			H-3	0.6 nCi/l	3.0
			Sr-90	0.1 pCi/l	11.3
			Ra-226	NA	- -

B. Drinking Water averages for 1978-1979 period in New York and New Jersey

Average for New York State locations	H-3	0.34 nCi/l	1.7
	Sr-90	0.56 pCi/l	7.0
Average for New Jersey locations	H-3	0.29 nCi/l	1.5
	Sr-90	0.025pCi/l	0.3

---

* Drinking Water Standards:

H-3	20,000 pCi/litre
Sr-90	8 pCi/litre
Ra-226	5 pCi/litre

Note: 1 nanoCurie/litre = 1000 picoCuries/litre

Appendix I

ANCON, PANAMA CANAL

Description of Analysis: Drinking Water Tritium Concentration

(nCi/l ± e)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1977	0.4 ± 0.2	0.2 ± 0.2	0.1 ± 0.2	0.3 ± 0.2
1978	0.2 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.2 ± 0.2
1979	0.2 ± 0.2	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l ± e)	Sr-90 (pCi/l ± e)	Alpha and Gamma (pCi/l ± e)
6/8/77	188.0	<1.0 ± 1.0	-0.1 ± 0.1	Alpha: <2.0 ± 2.0 Gamma: NA
6/3/78	84.2	1.2 ± 0.9	-0.5 ± 2.2	Alpha: <2.0 ± 2.0 Gamma: ND
3/28/79	80.6	<1.0 ± 1.0	0.2 ± 0.9	Alpha: <2.0 ± 2.0 Gamma: ND

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Concentration (pCi/l ± e)
5/8/77	0.2 ± 0.2
1/25/78	-0.02 ± 0.1
1979	NS

NA: No analysis
ND: No detectable levels
NS: No sample

ALBANY, NEW YORK

Description of Analysis: Drinking Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.3 ± 0.2	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1978	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2	0.3 ± 0.2
1979	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.3 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l)	Sr-90 (pCi/l)	Alpha and Gamma (pCi/l)
6-08-77	68.0	1.1 ± 1.0	0.8 ± 2.9	<2.0 ± 2.0
7-18-78	85.8	1.0 ± 0.9	0.4 ± 0.4	Alpha: <2.0 ± 2.0 Gamma: ND
4-4-79	75.8	1.1 ± 0.8	0.6 ± 0.9	Alpha: <2.0 ± 2.0 Gamma: ND

Description of Analysis: Iodine-131 Concentration in Drinking Water (Annual Analysis)

Date Collected	Concentration (pCi/l ± e)
7-5-77	0.1 ± 0.2
4-3-78	0.01 ± 0.01
1-2-79	-0.3 ± 0.1

ND: No Detectable Levels

nCi/l: nanocuries per liter (10^{-9} Curies/liter)
pCi/l: picocuries per liter (10^{-12}Curies/liter)
e: 2 sigma counting error

BAYSIDE, NEW JERSEY (on the Delaware River)

Description of Analysis: Annual Gamma Analysis: Surface Water

4-27-77	ND
1978	NA
5-14-79	ND

Description of Analysis: Surface Water Tritium Concentration (nCi/l) ± 2 σ

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.3 ± 0.2	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1978	0.3 ± 0.2	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1979	0.3 ± 0.2	0.3 ± 0.2	0.3 ± 0.2	0.2 ± 0.2

NA: No Analysis
ND: No gamma activity detectable

BUFFALO, NEW YORK

Description of Analysis: Concentrations of Radionuclides in Pasteurized Milk Samples**

Month	K-40 (g/l) 1977	1978	1979	Cs-137 (pCi/l) 1977	1978	1979
January	1.50±0.12	1.66±0.12	NDP	0 ± 8	16 ± 7	NDP
February	1.59±0.13	1.57±0.12	1.59±0.12*	9 ± 8	11 ± 7	1 ± 7*
March	1.59±0.13	1.61±0.12	1.44±0.12	11 ± 8	12 ± 7	5 ± 7
April	1.50±0.12	NA	1.60±0.12	2 ± 7	NA	9 ± 7
May	1.54±0.12	1.53±0.12	1.45±0.12	4 ± 7	5 ± 7	4 ± 7
June	1.60±0.12	1.48±0.12	1.41±0.12	3 ± 7	1 ± 7	2 ± 7
July	1.48±0.12	1.40±0.12	1.45±0.12	6 ± 7	6 ± 7	2 ± 7
August	1.50±0.12	1.42±0.12	1.40±0.12	1 ± 7	2 ± 7	3 ± 7
September	1.49±0.12	1.53±0.12	1.43±0.12	3 ± 7	2 ± 7	5 ± 7
October	1.5 ±0.1	1.43±0.12	1.46±0.12	8 ± 7	2 ± 7	2 ± 7
November	1.5 ±0.1	1.52±0.12	1.52±0.88	9 ± 7	5 ± 7	2 ± 5
December	1.49±0.12	1.37±0.12	1.36±0.12	5 ± 7	1 ± 7	-1 ± 7

	Ba-140 (pCi/l) 1977	1978	1979	I-131 (pCi/l) 1977	1978	1979
January	2 ± 9	1 ± 8	NDP	6 ± 7	9 ± 7	NDP
February	2 ± 9	6 ± 8	0.5 ± 8*	8 ± 7	2 ± 7	3.5 ± 7*
March	5 ± 9	-2 ± 8	3 ± 8	1 ± 7	5 ± 7	6 ± 7
April	1 ± 9	NA	-4 ± 8	0 ± 7	NA	2.0 ± 7
May	5 ± 9	-5 ± 8	1 ± 8	-1 ± 7	3 ± 7	0.0 ± 7
June	6 ± 9	-4 ± 8	-3 ± 8	-3 ± 7	0 ± 7	-6 ± 7
July	-6 ± 9	8 ± 8	-6 ± 8	-1 ± 7	-1 ± 7	2 ± 7
August	8 ± 9	2 ± 8	-6 ± 8	-1 ± 7	-3 ± 7	6 ± 7
September	6 ± 9	10 ± 8	2 ± 8	-3 ± 7	8 ± 7	2 ± 7
October	12 ± 10	1 ± 8	1 ± 8	25 ± 11	-3 ± 7	2 ± 7
November	5 ± 8	-2 ± 8	-4 ± 6	7 ± 7	1 ± 7	5 ± 5
December	7 ± 8	0 ± 8	3 ± 8	-5 ± 7	3 ± 7	0 ± 7

NDP: No Data Provided for this month.
NA: No Analysis
** Prior to 1978, these milk samples were collected at Niagara Falls, New York.
* Average of two sampling values.

CRISTOBAL, PANAMA CANAL

Description of Analysis: Concentration of Radionuclides in Pasteurized Milk Samples

Month	K-40 (g/l ± e) 1977	1978	1979	Cs-137 (pCi/l ± e) 1977	1978	1979
January	1.60±0.13	1.64±0.13	1.60±0.13*	40 ± 9	18 ± 7	14 ± 8*
February	1.62±0.13	1.52±0.12	1.42±0.12	17 ± 8	23 ± 7	21 ± 7
March	1.55±0.12	1.41±0.12	1.50±0.12	26 ± 8	13 ± 7	7 ± 7
April	1.52±0.12	1.51±0.12	NS	28 ± 8	20 ± 7	NS
May	1.52±0.12	1.60±0.12	1.20±0.21	25 ± 8	13 ± 7	17 ± 15
June	1.46±0.12	1.43±0.12	1.48±0.12	33 ± 8	20 ± 7	13 ± 7
July	1.54±0.12	1.59±0.22	1.55±0.12	5 ± 7	20 ± 15	18 ± 7
August	1.64±0.12	1.44±0.12	1.28±0.12	21 ± 8	14 ± 7	0 ± 7
September	1.51±0.12*	1.63±0.12	1.34±0.12	17 ± 8*	10 ± 7	13 ± 7
October	1.6 ±0.1 *	1.54±0.12	1.43±0.12	22 ± 8*	23 ± 7	20 ± 7
November	1.6 ±0.1	1.51±0.12	1.45±0.12	9 ± 7	19 ± 7	11 ± 7
December	1.6 ±0.12	1.44±0.12*	1.51±0.12	15 ± 7	15 ± 7*	9 ± 7

	Ba-140 (pCi/l ± e) 1977	1978	1979	I-131 (pCi/l ± e) 1977	1978	1979
January	8 ± 9	2 ± 9	3 ± 9*	2 ± 7	8 ± 7	1 ± 8
February	1 ± 9	1 ± 8	-1 ± 8	2 ± 7	4 ± 7	0 ± 7
March	3 ± 9	1 ± 8	-8 ± 8	2 ± 7	2 ± 7	1 ± 7
April	-6 ± 9	-2 ± 8	NS	3 ± 7	0 ± 7	NS
May	1 ± 9	-6 ± 8	4 ± 20	2 ± 7	3 ± 7	0 ± 13
June	4 ± 9	0 ± 8	-4 ± 8	3 ± 7	2 ± 7	3 ± 7
July	-3 ± 9	4 ± 20	-6 ± 8	2 ± 7	9 ± 13	-1 ± 7
August	-1 ± 9	2 ± 8	0 ± 8	-1 ± 7	1 ± 7	-4 ± 7
September	5 ± 9*	-3 ± 8	-4 ± 8	-4 ± 7*	2 ± 7	2 ± 7
October	20 ± 11*	-5 ± 8	-2 ± 8	31 ± 11*	-1 ± 7	1 ± 7
November	0 ± 0	2 ± 8	-4 ± 8	5 ± 7	3 ± 7	5 ± 7
December	4 ± 8	-3 ± 8*	-2 ± 8	3 ± 7	2 ± 7*	5 ± 7

* Average of two or more samples collected during this month in response to the Chinese nuclear detonation on December 14, 1978 or September 17, 1977.

Description of Analysis: Strontium-90 and Strontium-89 in Pasteurized Milk (pCi/l ± e)

Year	^{90}Sr	^{89}Sr
1977	-2.6 ± 1.8	3 ± 5
1978	1.3 ± 0.9	0 ± 5
1979	NS	NS

NS: No sample

NEW YORK CITY

Description of Analysis: Average Gross Beta Measurements - Airborne Particulates (pCi/m^3 of air at STP)

Month	1977 5-hr Field Test	1977 EERF Lab	1978 5-hr Field Test	1978 EERF Lab	1979 5-hr Field Test	1979 EERF Lab
January	TI		NS	NS	0.1	0.03
February	TI		0.1	0.06	0.1	0.02
March	TI		0.3	0.45	0.1	0.02
April	TI		0.2	0.12	0.2	0.02
May	TI		0.1	0.07	0.1	0.02
June	TI		0.2	0.09	0.1	0.03
July	TI		0.2	0.09	0.2	0.02
August	NS		0.2	0.04	0.2	0.06
September	0.7	0.01	0.2	0.03	0.2	0.02
October	0.6	0.28	0.2	0.02	0.2	0.01
November	0.1	0.07	0.2	0.03	0.1	0.02
December	0.1	0.03	0.2	0.03	0.1	0.02

Description of Analysis: Precipitation Tritium Concentration ($nCi/l \pm e$)

Month	1977	1978	1979
January	TI	0.2 ± 0.2	0.2 ± 0.2
February	TI	0.3 ± 0.2	0.2 ± 0.2
March	TI	0.3 ± 0.2	0.3 ± 0.2
April	TI	0.4 ± 0.2	0.3 ± 0.2
May	TI	0.3 ± 0.2	0.2 ± 0.2
June	TI	0.5 ± 0.2	0.2 ± 0.2
July	NS	0.3 ± 0.2	0.2 ± 0.2
August	NS	0.3 ± 0.2	0.3 ± 0.2
September	0.5 ± 0.2	0.4 ± 0.2	0.3 ± 0.2
October	0.2 ± 0.2	0.3 ± 0.2	0.2 ± 0.2
November	0.2 ± 0.2	0.4 ± 0.2	0.3 ± 0.2
December	0.3 ± 0.2	0.4 ± 0.2	0.3 ± 0.2

NS: No sample
TI: Temporarily inoperable

NEW YORK CITY

Description of Analysis: Plutonium and Uranium in Airborne Particulates

Quarter	^{238}Pu aCi/m^3	±e	^{239}Pu aCi/m^3	±e	$^{239}Pu/^{238}Pu$ Ratio	±e
Jan.-Mar. '78	4.8	1.0	40.6	3.3	8.5	1.9
Apr.-June '78	2.0	0.5	41.0	3.0	20.5	5.3
July-Sept.'78	3.0	0.5	33.4	2.2	11.1	2.0
Oct.-Dec. '78	4.8	1.8	9.7	2.2	2.0	0.9
Jan.-Mar. '79	3.2	1.4	11.3	2.5	3.5	1.7
Apr.-June '79	3.9	1.4	18.7	3.4	4.8	2.0
July-Sept.'79	6.8	2.2	9.8	2.4	1.4	0.6

	^{234}U aCi/m^3	±e	^{235}U aCi/m^3	±e	^{238}U aCi/m^3	±e
Jan.-Mar. '78	43.8	4.4	3.8	1.7	38.8	3.9
Apr.-June '78	17.8	2.1	1.1	0.4	16.5	2.1
July-Sept.'78	25.3	1.8	2.3	0.4	24.8	1.7
Oct.-Dec. '78	21.4	4.1	1.9	0.9	22.4	4.2
Jan.-Mar. '79	31.6	5.7	1.5	0.7	33.0	5.9
Apr.-June '79	25.1	4.3	1.7	0.7	26.0	4.5
July-Sept.'79	18.2	3.5	1.0	0.6	16.3	3.2

Plutonium ratios are calculated on unrounded raw values.

The ^{238}Pu and ^{239}Pu concentrations reported in this table have been rounded.

TI: Temporarily inoperable
e: 2 sigma counting error
aCi: attocuries (10^{-18} Curies)

NEW YORK CITY

Description of Analysis: Drinking Water Tritium Concentration
(nCi/l ± 2 σ)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	NS	NS	NS	0.4 ± 0.2
1978	0.2 ± 0.2	0.2 ± 0.2	NS	0.4 ± 0.2
1979	NA	0.2 ± 0.2	0.3 ± 0.2	0.3 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l ± e)	Sr-90 (pCi/l ± e)	Alpha and Gamma (pCi/l ± e)
6-8-77	52.0	<1.0±1.0	0.2±0.4	Alpha: <2.0±2.0 Gamma: NA
7-18-78	56.2	1.4±0.8	0.1±0.1	Alpha: <2.0±2.0 Gamma: ND
4-4-79	57.4	1.7±1.0	0.2±0.2	Alpha: <2.0±2.0 Gamma: ND

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Iodine Concentration (pCi/l ± e)	
10-21-77	0.2	0.2
10-13-78	0.00	
12-28-79	-0.2	0.1

e: 2 sigma counting error
NA: No Analysis
ND: Not Detectable
NS: No Sample Taken

NEW YORK CITY

Description of Analysis: Concentration of Radionuclides in Pasteurized Milk Samples

Month	K-40 (g/l ± e) 1977	1978	1979	Cs-137 (pCi/l ± e) 1977	1978	1979
January	1.56±0.13	1.56±0.12	NDP	7 ± 8	14 ± 7	NDP
February	1.59±0.13	1.52±0.12	1.42±0.12	8 ± 8	14 ± 7	0 ± 7
March	1.58±0.13	1.52±0.12	NA	2 ± 8	5 ± 7	NA
April	1.49±0.12	NA	NS	6 ± 7	NA	NS
May	1.49±0.12	1.47±0.12	1.44±0.12	1 ± 7	5 ± 7	6 ± 7
June	1.49±0.12	1.47±0.12	1.41±0.12	6 ± 7	2 ± 7	2 ± 7
July	1.53±0.12	1.52±0.12	1.50±0.12	6 ± 7	4 ± 7	0 ± 7
August	1.42±0.12	1.42±0.12	1.39±0.12	6 ± 7	6 ± 7	4 ± 7
September	1.54±0.12	1.44±0.12	1.46±0.12	6 ± 7	5 ± 7	3 ± 7
October	1.5 ±0.1	1.37±0.12	1.50±0.08	10 ± 7	5 ± 7	4 ± 5
November	1.6 ±0.1	1.61±0.12	1.51±0.12	7 ± 7	11 ± 15	2 ± 7
December	1.53±0.12	1.56±0.12	1.54±0.08	11 ± 7	3 ± 7	9 ± 5

	Ba-140 (pCi/l ± e) 1977	1978	1979	I-131 (pCi/l ± e) 1977	1978	1979
January	4 ± 9	3 ± 8	NDP	4 ± 7	0 ± 7	NDP
February	4 ± 9	8 ± 8	8 ± 8	4 ± 7	5 ± 7	-2 ± 7
March	5 ± 9	4 ± 8	NA	1 ± 7	-3 ± 7	NA
April	0 ± 9	NA	NS	1 ± 7	NA	NS
May	4 ± 9	-5 ± 8	5 ± 8	3 ± 7	5 ± 7	-5 ± 7
June	6 ± 9	1 ± 8	-2 ± 8	1 ± 7	1 ± 7	0 ± 7
July	-2 ± 9	4 ± 8	-5 ± 8	-5 ± 7	2 ± 7	2 ± 7
August	-3 ± 9	0 ± 8	5 ± 8	-4 ± 7	1 ± 7	5 ± 7
September	-1 ± 9	-5 ± 8	2 ± 8	1 ± 7	3 ± 7	3 ± 7
October	12 ± 9	1 ± 8	-1 ± 6	20 ± 9	5 ± 7	6 ± 5
November	3 ± 8	-12 ± 19	0 ± 8	8 ± 7	7 ± 7	2 ± 7
December	0 ± 8	6 ± 8	4 ± 6	-1 ± 7	-2 ± 7	4 ± 5

NA: No analysis
NDP: No data provided for this month.

NEW YORK CITY

Description of Analysis: Environmental Gamma Ambient Monitoring Program

Date Range	Integrated Exposure (mR ± e)		Exposure Rate (μR/h ± e)	
122978 - 20279	6.61	4.87	7.87	4.87
20279 - 22879	4.72	3.93	7.56	3.93
22879 - 33079	5.17	6.01	7.19	6.01
33079 - 43079	5.42	5.24	7.28	5.24
43079 - 60179	5.82	5.14	7.58	5.14
60179 - 63079	5.07	4.61	7.29	4.61
63079 - 80179	6.02	6.45	7.84	6.45
80179 - 90579	6.13	6.22	7.29	6.22
90579 -100279	5.02	5.45	7.75	5.45
100279 -110879	6.83	4.49	7.69	4.49
110879 -121079	6.27	7.16	-.16	7.16
121079 - 10380	4.17	9.87	7.24	9.87

NIAGARA FALLS, NEW YORK

Description of Analysis:

Average Gross Beta Measurements - Airborne Particulates (pCi/m^3 of air at STP)

Month	1977 5-hr Field Test	1977 EERF Lab	1978 5-hr Field Test	1978 EERF Lab	1979 5-hr Field Test	1979 EERF Lab
January	0.1	0.03	0.3	0.07	<0.1	0.03
February	0.1	0.03	0.1	0.07	<0.1	0.03
March	0.1	0.04	0.5	0.21	0.1	0.05
April	0.2	0.10	0.3	0.05	0.4	0.03
May	0.5	0.22	0.3	0.11	0.2	0.02
June	0.4	0.21	0.4	0.10	0.3	0.03
July	0.4	0.15	0.4	0.08	0.4	0.02
August	0.3	0.13	0.2	0.05	0.3	0.05
September	0.4	0.01	0.2	0.03	0.2	0.02
October	0.5	0.25	0.1	0.02	0.2	0.01
November	0.2	0.07	0.2	0.04	0.2	0.02
December	0.1	0.05	0.1	0.03	0.1	0.02

Description of Analysis:

Precipitation Tritium Concentration ($nCi/l \pm e$)

Month	1977	1978	1979
January	0.5 ± 0.2	NS	NS
February	0.5 ± 0.2	0.5 ± 0.2	NS
March	NS	0.5 ± 0.2	0.3 ± 0.2
April	0.3 ± 0.2	0.5 ± 0.2	0.3 ± 0.2
May	0.3 ± 0.2	0.5 ± 0.2	0.4 ± 0.2
June	0.4 ± 0.2	0.4 ± 0.2	0.2 ± 0.2
July	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.2
August	0.4 ± 0.2	0.4 ± 0.2	0.3 ± 0.2
September	0.3 ± 0.2	0.4 ± 0.2	0.4 ± 0.2
October	0.6 ± 0.2	0.3 ± 0.2	0.3 ± 0.2
November	0.5 ± 0.2	0.4 ± 0.2	0.3 ± 0.2
December	NS	0.3 ± 0.2	0.3 ± 0.2

NS: No sample taken

NIAGARA FALLS, NEW YORK

Description of Analysis: Plutonium and Uranium in Airborne Particulates

Quarter	^{238}Pu aCi/m^3 ± e		^{239}Pu aCi/m^3 ± e		$^{239}Pu/^{238}Pu$ Ratio ± e	
Jan.-Mar. '78	1.9	0.4	25.5	1.9	13.4	3.3
Apr.-June '78	5.0	0.7	51.7	3.1	10.3	1.6
July-Sept.'78	9.5	1.1	36.9	2.8	3.9	0.6
Oct.-Dec. '78	6.1	2.2	15.9	3.2	2.6	1.1
Jan.-Mar. '79	4.5	2.1	13.2	3.2	2.9	1.5
Apr.-June '79	3.2	1.6	16.3	3.3	5.2	2.8
July-Sept.'79	8.8	2.5	15.1	3.2	1.7	0.6

	^{234}U aCi/m^3 ± e		^{235}U aCi/m^3 ± e		^{238}U aCi/m^3 ± e	
Jan.-Mar. '78	80.4	5.6	6.6	1.0	75.8	5.3
Apr.-June '78	111.0	10.0	6.3	1.4	122.0	10.9
July-Sept.'78	111.0	6.7	7.4	0.7	111.0	6.7
Oct.-Dec. '78	165.0	22.3	5.2	1.7	170.0	22.9
Jan.-Mar. '79	100.4	16.0	5.1	1.5	106.9	16.9
Apr.-June '79	97.9	16.8	4.8	1.8	93.1	16.1
July-Sept.'79	46.5	7.2	4.1	1.2	42.4	6.7

Plutonioum ratios are calculated on unrounded raw values.

The ^{238}Pu and ^{239}Pu concentrations reported in this table have been rounded.

Description of Analysis: Iodine-131 in Drinking Water (Annual Analysis)

Date Collected	Iodine Concentration (pCi/l ± e)	
7-11-77	-0.2	0.2
4-3-78	-0.27	0.05
1-2-79	0.0	0.0

NIAGARA FALLS, NEW YORK

Description of Analysis: Drinking Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.5 ± 0.2	0.3 ± 0.2	0.3 ± 0.2	0.3 ± 0.2
1978	0.5 ± 0.2	0.4 ± 0.2	0.5 ± 0.2	0.3 ± 0.2
1979	0.4 ± 0.2	0.4 ± 0.2	0.3 ± 0.2	0.4 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l)	Sr-90 (pCi/l)	Alpha and Gamma (pCi/l)
6/08/77	340.0	2.5 ± 1.2	0.6 ± 0.3	Alpha: 2.0 ± 2.0
7/18/78	186.0	2.8 ± 1.3	0.9 ± 0.5	Alpha: <2.0 ± 2.0 Gamma: ND
4/4/79	186.6	2.3 ± 1.0	1.1 ± 0.5	Alpha: <2.0 ± 2.0 Gamma: ND

ND: Not detectable
NS: No sample taken
e: 2 sigma counting error

OSSINING, NEW YORK (Hudson River)

Description of Analysis: Surface Water Tritium Concentration (nCi/l ± 2 σ)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1978	0.2 ± 0.2	0.4 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1979	0.3 ± 0.2	0.4 ± 0.2	0.3 ± 0.2	0.4 ± 0.2

Description of Analysis: Surface Water Annual Gamma Analysis

Date Collected	Gamma (pCi/l ± e)
4/2/77	ND
4/10/78	ND
4/5/79	ND

ND: No gamma activity detectable

OSWEGO, NEW YORK (Lake Ontario)

Description of Analysis: Surface Water Tritium Concentration (nCi/l ± 2 σ)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	NS	0.6 ± 0.2	0.5 ± 0.2	0.4 ± 0.2
1978	0.4 ± 0.2	0.3 ± 0.2	0.5 ± 0.2	0.5 ± 0.2
1979	0.6 ± 0.2	0.5 ± 0.2	0.5 ± 0.2	0.5 ± 0.2

Description of Analysis: Surface Water Annual Gamma Analysis

Date Collected	Gamma (pCi/l ± e)
4/4/77	ND
4/12/78	ND
4/17/79	ND

ND: No detectable levels
NS: No sample taken

OYSTER CREEK, NEW JERSEY

Description of Analysis: Surface Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.2 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1978	0.3 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1979	0.1 ± 0.2	0.3 ± 0.2	0.3 ± 0.2	0.2 ± 0.2

Description of Analysis: Annual Gamma Analysis: Drinking Water

4/28/77	K-40	213 ± 81 pCi/l
4/01/78	K-40	174 ± 45 pCi/l
5/04/79	K-40	115 ± 77 pCi/l

POUGHKEEPSIE, NEW YORK (Hudson River)

Description of Analysis: Surface Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.3 ± 0.2	0.3 ± 0.2	0.4 ± 0.2	0.3 ± 0.2
1978	0.4 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.4 ± 0.2
1979	0.4 ± 0.2	0.5 ± 0.2	0.3 ± 0.2	0.4 ± 0.2

Description of Analysis: Surface Water Annual Gamma Analysis

Date Collected	Gamma (pCi/l ± e)
4/6/77	ND
4/5/78	ND
4/5/79	ND

SAN JUAN, PUERTO RICO

Description of Analysis: Drinking Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.2 ± 0.2	0.2 ± 0.2	0.3 ± 0.2	0.3 ± 0.2
1978	0.3 ± 0.2	0.1 ± 0.2	0.2 ± 0.2	0.2 ± 0.2
1979	0.3 ± 0.2	NS	NS	NS

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l ± e)	Sr-90 (pCi/l ± e)	Alpha and Gamma (pCi/l ± e)
6/08/77	344.0	1.9 ± 1.1	0.3 ± 0.5	ND
7/31/78	243.4	2.9 ± 1.2	0.1 ± 0.2	Alpha: <2.0 ± 2.0 Gamma: ND
4/5/79	210.4	2.8 ± 1.0	0.1 ± 0.1	Alpha: <2.0 ± 2.0 Gamma: ND

NA: No analysis
ND: Not detectable
NS: No sample taken

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Concentration (pCi/l ± e)
10/5/77	- 0.1 ± 0.2
1/9/79 (sample for 1978)	- 0.34 ± 0.09

No further sample taken in 1979.

SAN JUAN, PUERTO RICO

Description of Analysis: Concentration of Radionuclides in Pasteurized Milk Samples

Month	K-40 (g/l ± e) 1977	1978	1979	Cs-137 (pCi/l ± e) 1977	1978	1979
January	1.48±0.12	1.52±0.12	NDP	4 ± 8	13 ± 7	NDP
February	1.78±0.13	1.49±0.12	1.46±0.12	3 ± 8	10 ± 7	5 ± 7
March	1.73±0.13	1.55±0.12	1.43±0.12	0 ± 8	9 ± 7	4 ± 7
April	1.61±0.12	NA	1.44±0.12	8 ± 8	NA	9 ± 7
May	1.56±0.12	1.53±0.12	1.26±0.22	7 ± 7	4 ± 7	4 ± 15
June	1.55±0.12	1.52±0.12	1.47±0.12	4 ± 7	10 ± 7	2 ± 7
July	1.53±0.12	1.39±0.12	1.42±0.12	5 ± 7	1 ± 7	3 ± 7
August	1.47±0.12	1.42±0.12	1.42±0.12	5 ± 7	7 ± 7	5 ± 7
September	1.56±0.12	1.43±0.12	1.40±0.12	7 ± 7	8 ± 7	7 ± 7
October	1.5 ±0.1	1.40±0.12	1.38±0.22	8 ± 7	7 ± 7	5 ± 15
November	1.6 ±0.1	1.50±0.12	1.39±0.12	5 ± 7	7 ± 7	5 ± 7
December	1.54±0.12	1.30±0.12	1.37±0.12	10 ± 7	9 ± 7	3 ± 7

	Ba-140 (pCi/l ± e) 1977	1978	1979	I-131 (pCi/l ± e) 1977	1978	1979
January	0 ± 9	8 ± 8	NDP	4 ± 7	-1 ± 7	NDP
February	4 ± 9	4 ± 8	-4 ± 8	1 ± 7	7 ± 7	1 ± 7
March	2 ± 9	6 ± 8	1 ± 8	1 ± 7	-2 ± 7	-1 ± 7
April	3 ± 9	NA	-1 ± 8	-1 ± 7	NA	0 ± 7
May	1 ± 9	2 ± 8	-2 ± 19	1 ± 7	-2 ± 7	3 ± 13
June	4 ± 9	3 ± 8	-7 ± 8	2 ± 7	-1 ± 7	4 ± 7
July	-1 ± 9	4 ± 8	-4 ± 8	-1 ± 7	1 ± 7	2 ± 7
August	3 ± 9	1 ± 8	0 ± 8	2 ± 7	1 ± 7	6 ± 7
September	0 ± 9	-3 ± 8	-8 ± 8	1 ± 7	-3 ± 7	1 ± 7
October	6 ± 8	2 ± 8	-9 ± 19	8 ± 6	-1 ± 7	0 ± 13
November	6 ± 8	-3 ± 8	4 ± 8	0 ± 0	5 ± 7	3 ± 7
December	9 ± 8	6 ± 8	-6 ± 8	0 ± 7	-1 ± 7	-1 ± 7

NA: No analysis
NDP: No data provided for this month.

SYRACUSE, NEW YORK

Description of Analysis: Drinking Water Tritium Concentration (nCi/l ± e)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	NS	NS	0.1 ± 0.2	0.5 ± 0.2
1978	0.5 ± 0.2	0.4 ± 0.2	NS	0.4 ± 0.2
1979	0.4 ± 0.2	NS	0.3 ± 0.2	0.5 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta (pCi/l ± e)	SR-90 (pCi/l ± e)	Alpha & Gamma (pCi/l e)
7/08/77	192.0	2.4 ± 1.1	0.9 ± 0.5	Alpha: ND Gamma: NA
7/21/78	130.4	3.1 ± 1.0	0.5 ± 0.4	Alpha: <2.0 ± 2.0 Gamma: ND
4/04/79	113.8	1.5 ± 1.1	0.7 ± 0.5	Alpha: <2.0 ± 2.0 Gamma: ND

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Concentration (pCi/l ± e)
9/28/77	1.3 ± 0.2
1/25/78	-0.04 ± 0.01
3/10/79	0.2 ± 0.1

ND: Not detectable
NA: No analysis
NS: No sample

SYRACUSE, NEW YORK

Description of Analysis: Concentration of Radionuclides in Pasteurized Milk Samples

	K-40 (g/l ± e)			Cs-137 (pCi/l ± e)		
Month	1977	1978	1979	1977	1978	1979
January	1.61±0.13	1.58±0.12	NDP	8 ± 8	12 ± 7	NDP
February	1.55±0.13	1.59±0.12	1.49±0.12	0 ± 8	7 ± 7	4 ± 7
March	1.55±0.12	1.49±0.12	1.53±0.22	3 ± 8	9 ± 7	8 ± 15
April	1.59±0.12	NA	1.58±0.12	5 ± 7	NA	4 ± 7
May	1.56±0.12	1.43±0.12	1.24±0.21	-3 ± 7	5 ± 7	-7 ± 14
June	1.48±0.12	1.33±0.12	1.39±0.12	4 ± 7	4 ± 7	0 ± 7
July	1.54±0.12	1.43±0.12	1.51±0.12	3 ± 7	5 ± 7	5 ± 7
August	1.44±0.12	1.43±0.12	1.50±0.22	7 ± 7	7 ± 7	8 ± 15
September	1.46±0.12	1.48±0.12	1.34±0.08	3 ± 7	6 ± 7	4 ± 5
October	1.5 ±0.10	1.49±0.12	1.32±0.12	8 ± 7	4 ± 7	6 ± 7
November	NS	1.47±0.12	1.44±0.12	NS	4 ± 7	2 ± 7
December	NS	1.47±0.12	1.43±0.08	NS	2 ± 7	3 ± 5

	Ba-140 (pC/l ± e)			I-131 (pCi/l ± e)		
	1977	1978	1979	1977	1978	1979
January	4 ± 9	4 ± 8	NDP	1 ± 7	-2 ± 7	NDP
February	6 ± 9	6 ± 8	5 ± 8	5 ± 7	0 ± 7	6 ± 7
March	-1 ± 9	2 ± 8	-2 ± 20	6 ± 7	-1 ± 7	0 ± 13
April	4 ± 9	NA	-6 ± 8	-2 ± 7	NA	2 ± 7
May	6 ± 9	-5 ± 8	-8 ± 19	1 ± 7	5 ± 7	-4 ± 13
June	2 ± 9	3 ± 8	-2 ± 8	0 ± 7	-3 ± 7	0 ± 7
July	-1 ± 9	0 ± 8	-5 ± 8	1 ± 7	3 ± 7	-4 ± 7
August	3 ± 9	0 ± 8	11 ± 20	-4 ± 7	4 ± 7	13 ± 13
September	1 ± 9	5 ± 8	-3 ± 6	2 ± 8	5 ± 7	6 ± 5
October	10 ± 9	-3 ± 8	3 ± 8	21 ± 8	2 ± 7	3 ± 7
November	NS	4 ± 8	4 ± 8	NS	10 ± 7	7 ± 7
December	NS	0 ± 8	-3 ± 6	NS	4 ± 7	4 ± 5

NS: No sample
NA: No analysis
NDP: No data provided this month

TRENTON, NEW JERSEY

Description of Analysis:

Average Gross Beta Measurements - Airborne Particulates (pCi/m^3 of air at STP)

Month	1977		1978		1979	
	5-hr Field Test	EERF Lab	5-hr Field Test	EERF Lab	5-hr Field Test	EERF Lab
January	NS	NS	0.1	0.06	0.1	0.03
February	NS	NS	0.2	0.08	<0.1	0.02
March	NS	NS	0.9	0.45	<0.1	0.03
April	0.2	0.09	0.3	0.12	0.4	0.02
May	0.2	0.15	0.1	0.07	0.6	0.02
June	0.3	0.17	0.2	0.10	0.4	0.02
July	0.3	0.14	0.2	0.08	0.4	0.02
August	0.2	0.09	0.2	0.04	0.5	0.01
September	0.8	0.01	0.2	0.3	0.8	0.02
October	1.0	0.20	0.6	0.3	0.8	0.02
November	0.1	0.06	0.4	0.4	0.6	0.03
December	0.1	0.05	0.6	0.4	0.6	0.04

NS: No sample taken

TRENTON, NEW JERSEY

Description of Analysis: Plutonium and Uranium in Airborne Particulates

Quarter	^{238}Pu aCi/m^3 ±e		^{239}Pu aCi/m^3 ±e		$^{239}Pu/^{238}Pu$ Ratio	±e
Jan.-Mar. '78	1.5	0.5	36.1	2.9	24.1	8.7
Apr.-June '78	1.7	0.5	34.0	2.6	20.2	6.1
July-Sept.'78	17.2	2.5	47.8	4.5	2.8	0.5
Oct.-Dec. '78	3.5	2.1	12.0	2.9	3.5	2.2
Jan.-Mar. '79	2.7	4.8	14.0	5.4	5.2	9.5
Apr.-June '79	6.7	2.7	24.7	5.1	3.7	1.7
July-Sept.'79	7.8	2.7	12.1	2.9	1.6	0.7

	^{234}U aCi/m^3 ±e		^{235}U aCi/m^3 ±e		^{238}U aCi/m^3 ±e	
Jan.-Mar. '78	38.7	3.0	3.4	1.2	32.7	4.3
Apr.-June '78	16.6	2.3	2.4	0.8	17.6	2.4
July-Sept.'78	20.1	2.8	2.4	0.8	21.2	3.0
Oct.-Dec. '78	24.5	4.3	2.2	1.0	20.1	3.8
Jan.-Mar. '79	26.2	7.6	3.1	2.3	34.4	9.1
Apr.-June '79	25.0	5.3	2.3	1.2	23.0	4.9
July-Sept.'79	21.5	4.6	4.0	1.5	16.4	3.7

Plutonium ratios are calculated on unrounded raw values.

The ^{238}Pu and ^{239}Pu concentrations reported in this table have been rounded.

TRENTON, NEW JERSEY

Description of Analysis: Precipitation Tritium Concentration

Month	1978 nCi/l ± e		1979 nCi/l ± e	
January	0.2	0.2	0.3	0.2
February	NS		0.6	0.2
March	NS		0.4	0.2
April	NS		0.1	0.2
May	NS		0.3	0.2
June	NS		0.3	0.2
July	NS		0.2	0.2
August	0.3	0.2	0.2	0.2
September	0.3	0.2	0.3	0.2
October	0.3	0.2	0.3	0.2
November	0.3	0.2	0.2	0.2
December	0.5	0.2	0.4	0.2

NS: No sample

Description of Analysis: Annual Plutonium and Uranium Analysis of Selected Drinking Water Composite Samples

Year	^{238}Pu pCi/l ± e		^{239}Pu pCi/l ± e		^{234}Pu pCi/l ± e		^{235}U pCi/l ± e		^{238}U pCi/l ± e	
1977	0.013	0.005	0.025	0.008	0.021	0.008	0.003	0.003	0.013	0.006
1978	0.005	0.009	0.006	0.004	0.031	0.009	0.002	0.002	0.013	0.005

The minimum detectable limit is 0.015 pCi/ sample, for each individual isotope.

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Concentration (pCi/l ± e)
10-18-77	0.8 ± 0.2
4-24-78	0.11 ± 0.02
7-18-79	0.00 ± 0.1

TRENTON, NEW JERSEY

Description of Analysis: Drinking Water Tritium Concentration (nCi/l) ± e

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.2 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.2 ± 0.2
1978	0.3 ± 0.2	0.3 ± 0.2	0.3 ± 0.2	0.4 ± 0.2
1979	0.3 ± 0.2	0.4 ± 0.2	0.2 ± 0.2	0.3 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids (mg/l)	Gross Beta pCi/l ± e	Sr-90 pCi/l ± e	Alpha and Gamma pCi/l ± e
6-08-77	178.0	1.5 ± 1.0	0.6 ± 0.9	Alpha: ND Gamma: NA
7-18-78	135.4	1.9 ± 1.0	0.2 ± 0.2	Alpha: <2.0 ± 2.0 Gamma: ND
4-03-79	118.8	2.3 ± 1.0	-0.2 ± 0.3	Alpha: <2.0 ± 2.0 Gamma: ND

NA: No analysis
ND: Not detectable

TRENTON, NEW JERSEY

Description of Analysis: Concentration of Radionuclides in Pasteurized Milk Samples

	K-40 (g/l ± e)			Cs-137 (pCi/l ± e)		
Month	1977	1978	1979	1977	1978	1979
January	1.60±0.13	1.55±0.12	NDP	8 ± 8	12 ± 7	NDP
February	1.57±0.13	1.54±0.12	1.50±0.12	7 ± 8	11 ± 7	1 ± 7
March	1.49±0.12	1.48±0.12	1.49±0.12	1 ± 8	5 ± 7	2 ± 7
April	1.56±0.12	NS	1.25±0.21	1 ± 7	NS	-8 ± 14
May	1.49±0.12	1.48±0.12	1.47±0.12	8 ± 8	6 ± 7	6 ± 7
June	1.53±0.12	1.45±0.12	1.48±0.12	0 ± 7	11 ± 7	4 ± 7
July	1.45±0.12	1.44±0.12	1.45±0.12	6 ± 7	7 ± 7	1 ± 7
August	1.50±0.12	1.37±0.12	1.40±0.12	10 ± 8	9 ± 7	3 ± 7
September	1.55±0.12	1.48±0.12	1.47±0.12	6 ± 7	7 ± 7	2 ± 7
October	1.5 ±0.10	1.39±0.12	1.45±0.08	11 ± 7	9 ± 7	3 ± 5
November	1.4 ±0.10	1.55±0.12	1.48±0.12	7 ± 7	7 ± 7	4 ± 7
December	1.58±0.12	1.43±0.12	1.51±0.12	7 ± 7	4 ± 7	11 ± 7

	Ba-140 (pCi/l ± e)			I-131 (pCi/l ± e)		
	1977	1978	1979	1977	1978	1979
January	2 ± 9	10 ± 8	NDP	2 ± 7	-3 ± 7	NDP
February	7 ± 9	6 ± 8	0 ± 8	3 ± 7	7 ± 7	-4 ± 7
March	4 ± 9	8 ± 8	2 ± 8	-3 ± 7	2 ± 7	2 ± 7
April	2 ± 9	NS	-4 ± 19	3 ± 7	NS	-4 ± 13
May	-1 ± 9	-3 ± 8	0 ± 8	-1 ± 7	1 ± 7	-1 ± 7
June	5 ± 9	3 ± 8	-1 ± 8	3 ± 7	-7 ± 7	0 ± 7
July	-6 ± 9	-3 ± 8	3 ± 8	1 ± 7	0 ± 7	3 ± 7
August	3 ± 9	9 ± 8	-5 ± 8	3 ± 7	6 ± 7	6 ± 7
September	1 ± 9	9 ± 8	3 ± 8	NS	-1 ± 7	3 ± 7
October	8 ± 9	7 ± 8	0 ± 6	3 ± 7	4 ± 7	4 ± 5
November	3 ± 8	-1 ± 8	-2 ± 8	2 ± 7	7 ± 7	-7 ± 7
December	2 ± 8	1 ± 8	0 ± 8	-2 ± 7	1 ± 7	2 ± 7

NS: No sample taken
NDP: No data provided for this month

TRENTON, NEW JERSEY

Description of Analysis: Environmental Gamma Ambient Monitoring Program

Date Range	Integrated Exposure (mR ± e)		Exposure Rate (uR/h ± e)	
120178 - 10279	8.25	3.59	10.74	3.59
10279 - 20179	7.24	4.67	10.06	4.67
20179 - 30279	6.68	4.68	9.59	4.68
30279 - 33179	6.77	6.05	9.73	6.05
33179 - 50279	7.92	6.83	10.31	6.83
50279 - 60179	0.00	0.00	0.00	0.00
60179 - 70279	8.15	9.62	10.96	9.62
70279 - 80179	7.51	4.62	10.43	4.62
80179 - 83179	7.59	4.90	10.54	4.90
83179 -100179	7.89	3.62	10.61	3.62
100179 -110179	7.90	4.58	10.62	4.58
110179 -120479	00.00	0.00	00.00	0.00
120479 -123179	6.57	7.87	10.14	7.87
123179 - 20180	7.63	4.42	9.94	4.42

WARETOWN, NEW JERSEY

Description of Analysis: Drinking Water Tritium Concentration (nCi/l) ± e

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1977	0.3 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.3 ± 0.2
1978	0.2 ± 0.2	0.2 ± 0.2	0.2 ± 0.2	0.2 ± 0.2
1979	0.3 ± 0.2	0.3 ± 0.2	0.2 ± 0.2	0.6 ± 0.2

Description of Analysis: Annual Drinking Water

Date	Solids mg/l	Gross Beta pCi/l ± e	Sr-90 pCi/l ± e	Ra-226 pCi/l ± e	Alpha and Gamma pCi/l ± e
6-08-77	226.0	4.6 ± 1.2	-0.5 ± 0.4	0.9 ± 0.04	Alpha: 2.8 ± 1.4 Gamma: ND
7-10-78	95.8	1.2 ± 1.0	0.1 ± 0.3	NA	Alpha: <2.0 ± 2.0 Gamma: ND
4-03-79	86.0	3.3 ± 1.0	0.0 ± 0.1	NA	Alpha: <2.0 ± 2.0 Gamma: ND

Description of Analysis: Iodine-131 in Drinking Water

Date Collected	Concentration (pCi/l ± e)
7-07-77	-0.5 0.2
3-30-78	-0.10 0.02
10-11-79	-0.1 0.1

ND: No detectable
NA: No analysis

Appendix II

PASTEURIZED MILK - REGION II

Sr-89 and Sr-90 in Pasteurized Milk

Annual Report

	Sr-89 (pCi/l ± e)			Sr-90 (pCi/l ± e)		
	1977	1978	1979	1977	1978	1979
Buffalo*		2 ± 5	0 ± 5		2.1 ± 0.6	3.2 ± 1.2
Trenton	1 ± 5	0 ± 5	0 ± 5	5.1 ± 1.2	4.8 ± 1.3	4.6 ± 1.4
New York City	0 ± 5	2 ± 5	-5 ± 5	6.2 ± 1.2	4.2 ± 1.0	7.9 ± 1.6
Niagara Falls	2 ± 5			3.4 ± 1.0		
Syracuse	3 ± 5	-1 ± 5	0 ± 5	2.7 ± 0.8	4.4 ± 1.4	3.7 ± 1.2
San Juan	2 ± 5	-1 ± 5	-1 ± 5	1.4 ± 0.6	2.2 ± 1.2	1.6 ± 1.1

* Prior to 1978, these samples were collected at Niagara Falls.

Quarterly Composites**

Date	Sr-89	Sr-90
January 1977	-1 ± 5	3.7 ± 1.2
April 1977	0 ± 5	4.0 ± 1.3
October 1977	NS	NS
January 1978	2 ± 5	3.0 ± 0.8
April 1978	0 ± 5	3.7 ± 1.1
October 1978	0 ± 5	3.4 ± 1.1
January 1979	1 ± 5	3.4 ± 1.1
April 1978	2 ± 5	2.9 ± 0.9
October 1978	0 ± 5	3.3 ± 1.1

Note: Measurements in pCi/l ± 2 sigma counting error

** July samples comprise the Annual Composite Report.

Appendix III

Rn/Water
NEW JERSEY

Location	Type	Radon-222 Conc (pCi/l)+ 2 σ	Population Served
Bordontown	Public Supply	1342 ± 24%	Greater than 10,000
Burlington	"	1391 ± 24%	"
Denville	"	419 ± 22%	"
Denville	"	649 ± 12%	"
Deptford	"	1550 ± 17%	"
East Windsor	"	206 ± 37%	Unavailable
Fairfield	"	210 ± 41%	"
Freehold	"	74 ± 115%	"
Gibbstown	"	366 ± 25%	5,000 - 10,000
Hamilton Township	"	283 ± 27%	Unavailable
Mahwah Township	"	265 ± 33%	"
Manville	"	2542 ± 5%	"
Moorestown	"	1220 ± 20%	Greater than 10,000
Old Bridge	"	ND*	Unavailable
Paulsboro	"	333 ± 28%	5,000 - 10,000
Pompton Lakes	"	119 ± 30%	Unavailable
Thorofare	"	1507 ± 20%	Greater than 10,000
Toms River	"	251 ± 31%	Unavailable
Williamstown	"	387 ± 23%	5,000 - 10,000

* Not detectable

Rn/Water

NEW YORK

Location	Type	Radon-222 Conc (pCi/l) + 2 σ	Population Served
Almond	Public Supply	502 ± 13%	100-1,000
Baldwinsville	"	109 ± 107%	5,000-10,000
Batavia	"	256 ± 37%	Greater than 10,000
Bergan	"	478 ± 20%	1,000-5,000
Clinton	"	101 ± 40%	1,000-5,000
Clyde	"	71 ± 196%	1,000-5,000
Conklin	"	952 ± 11%	Less than 10,000
Dunkirk	"	ND	100-1,000
Endicott	"	696 ± 14%	Greater than 10,000
Jamesville	"	ND	100-1,000
Lyons	"	ND	1,000-5,000
Montgomery	Private Well	477 ± 12%	NA
Munnsville	Public Supply	47 ± 86%	Less than 100
Olean	"	357 ± 24%	Greater than 10,000
Oswego	"	ND	Greater than 10,000
Pittsford	"	ND	1,000-5,000
Saratoga Spa	Spring Water	248 ± 25%	NA
Southfields	Private Well	4,468 ± 2%	Less than 100
Suffern	Public Supply	459 ± 11%	5,000-10,000
Van Hornesville	"	131 ± 33%	Less than 100
Vestal	"	339 ± 24%	5,000-10,000
West Chili	"	ND	Less than 100

ND: No detectable

NA: Not available